

***Remarks***

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1 and 3-15 are pending in the application, with 1 being the independent claims. Claim 2 is sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Claims 1, 3-9, 13, and 14 are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

***Rejections under 35 U.S.C. § 102***

The Examiner has rejected claims 1, 2, 4, and 5 under 35 U.S.C. § 102(b) as being anticipated by the Niedringhaus paper (Niedringhaus, W., "An Agent-Based Model of the Airline Industry," June 15, 2000, The MITRE Corporation). The Examiner takes the position that all elements of claim 1 are disclosed by the Niedringhaus paper. In particular, the Examiner asserts that the Niedringhaus paper discloses a method that calls for "entering information concerning bankrupt airlines, newly created airports, and financial conditions at each airline" into the simulation (*see* Office Action, pages 2-3). Further, the Examiner contends that "entering information concerning a newly established airline" is functionally identical to entering information concerning an existing airline. As such, the Examiner alleges that this step is disclosed by the Niedringhaus paper even if not expressly stated within the paper.

Independent claim 1, as hereby amended, now calls for "eliminating bankrupt airlines from the airline structure". This amendment is fully supported by the specification (see paragraph [0025]) and is not believed to introduce new matter. The Niedringhaus paper discloses neither the presence of a bankrupt airline, nor any mechanism through which a bankrupt airline is removed from the airline structure.

Independent claim 1, as further amended, now calls for "determining whether to create a new airport within the existing airline structure". This amendment is also fully supported by the specification (see paragraph [0026]) and is not believed to introduce new matter. The Niedringhaus paper discloses that a "set of airports to model in detail" must be input into the ACSEM model (the Niedringhaus paper, Section 2.1). Further, the Niedringhaus paper discloses a discontinuous tool to change the number of airports served by an airline (the Niedringhaus paper, Section 3.2). However, the Niedringhaus paper specifically fails to teach any deterministic process through which the simulation adaptively creates a new airport within the existing airline structure in response to simulated market conditions.

Independent claim 1, as further amended, now calls for "entering data related to current financial conditions of each airline within the airline structure". This amendment is also fully supported by the specification (see paragraph [0027]) and is not believed to introduce new matter. The Niedringhaus paper discloses the input of "general economic conditions, such as interest rates and the availability of venture capital," into the ACSEM model (the Niedringhaus paper, Section 2.1). These general economic conditions are distinct from the specific financial conditions of an individual airline, and the

Niedringhaus paper fails to disclose the specification of the financial conditions of an individual airline.

Independent claim 1, as further amended, now calls for "determining whether to create a new airline within the airline structure". This amendment is also fully supported by the specification (see paragraph [0053]) and is not believed to introduce new matter. The Niedringhaus paper discloses the entry of information pertinent to each airline into the ACSEM model (the Niedringhaus paper, Section 2.1). However, the Niedringhaus paper fails to disclose any deterministic model through which the simulation adaptively creates a new airline in response to the simulated market conditions.

Claim 2 has been cancelled. Claims 4 and 5 each depend from and add features to independent claim 1. As such, these dependent claims are patentable for at least the reasons set forth above. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

***Rejections under 35 U.S.C. § 103***

The Examiner has rejected claims 3 and 6-15 under 35 U.S.C. § 103(a) as being unpatentable over the Niedringhaus paper. Claims 3 and 6-15 all depend from and add features to independent claim 1. As such, they are patentable for at least the reasons set forth above. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

***Other Matters***

The Examiner has requested that the Applicant provide additional information under 37 CFR § 1.105. The Applicant respectfully submits the following additional

information in response to each of the Examiner's requests. These requests, and the Applicant's response to each, are detailed in the following text.

*1. Please provide a citation and a copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the Applicant's information, particularly as to developing ACSEM (see Request for Additional Information, Page 3).*

- a. Campbell, *et al.*, "Modeling distributed human decision-making in traffic flow management operations," 3<sup>rd</sup> USA/Europe Air Traffic Management R&D Seminar, Napoli, Italy, June 13-16, 2000 (description of the IMPACT model).

Applicant respectfully submits that the development of the ACSEM model relied upon Campbell, *et al.* as reference material on the simulation of human decision-making in traffic flow management operations using high-fidelity, agent-based models. Campbell, *et al.* was made of record, but not relied upon, by the Examiner in the October 6, 2005 Office Action.

- b. Wojcik, *et al.*, "Modeling distributed human decision-making in traffic flow management operations," presentation at 3<sup>rd</sup> USA/Europe Air Traffic Management R&D Seminar, Napoli, Italy, June 13-16, 2000 (description of the IMPACT model).

Applicant respectfully submits that the development of the ACSEM model relied upon Wojcik, *et al.* as reference material on the simulation of human decision-making in traffic flow management operations using high-fidelity, agent-based models.

*2. Please provide the citation and copy of each publication which any of the applicants authored or co-authored and which describe the disclosed subject matter of airline simulations, especially those disclosing the ACSEM and IMPACT models (see Request for Additional Information, Page 3).*

The Applicant has authored a number of publications relating to the simulation of air traffic management operations, and in particular, to the simulation of en-route aircraft spacing protocols. These publications do not relate to the simulation of the economics of airline systems, and they are not of relevance to the disclosed ACSEM model or to its development.

The Applicant respectfully cites the following publication that details the development of the ACSEM model and that was relied upon by the Examiner in the October 6, 2005 Office Action.

Niedringhaus, W.P., "An agent-based model of the airline industry," The MITRE Corporation, June 15, 2000.

The cited article represents the only publication authored by the Applicant on the topic of agent-based models of airline economics. The Applicant has neither authored nor co-authored any publication related to the IMPACT model.

*3. Please state the specific improvements of the claimed subject matter in claims 1-15 (disclosing the ACSEM model) over prior art (the IMPACT model) and indicate the specific elements in the claimed ACSEM model that provide those improvements. (see Request for Additional Information, Page 3).*

The Applicant respectfully submits the following specified improvements of the claimed subject matter in amended claims 1 and 3-15 (the ACSEM model) over the prior

art (the IMPACT model). The claimed subject matter is found within the Niedringhaus application, and the disclosures of the prior art IMPACT model are identified as the Campbell paper (*see* Campbell, *et al.*, above) and the Wojcik presentation (*see* Wojcik, *et al.*, above).

a. The ACSEM model is an agent-based, air carrier service evolution model that simulates the economics of airline systems in response to individual market forces, interactions between market forces, and anticipated changes to market forces (see the Niedringhaus application, abstract, claim 1 and paragraphs [0001]-[0003] and [0007]). The IMPACT model is an agent-based computer simulation model of distributed human decision making in Traffic Flow Management (TFM) operations when weather disrupts airline schedules. (see the Campbell paper, abstract).

b. The ACSEM model simulates the economics of airlines through an airline structure that contains a plurality of individual airports and the individual flights that serve these airports (the Niedringhaus application, claim 1, claims 3-4, and paragraphs [0024] and [0026]). The IMPACT model simulates TFM operations using the simplified test case of a single airport (the Campbell paper, page 3, column 1; the Wojcik presentation, page 7).

c. The ACSEM model provides the opportunity to introduce airports into the existing airline structure based on simulated market conditions (the Niedringhaus application, claim 1 and paragraph [0026]). The IMPACT model examines the impact of TFM operations on the scheduled arrivals of a number of airlines at a single airport (the Campbell paper, page 3, column 1 and the Wojcik presentation, page 7).

d. The financial state of an airline within the airline structure is important to the ACSEM model, and the current financial conditions of each airline within the airline structure are required inputs to the ACSEM model (the Niedringhaus application, claim 1 and paragraph [0027]). The IMPACT model does not specifically address the financial conditions of any individual airline. The economic costs associated with TFM operations are computed by the IMPACT model on a "cost per flight" basis (the Campbell paper, Table 1) or as a total cost per TFM operation (the Wojcik presentation, page 14).

e. The ACSEM model eliminates bankrupted airlines from the current airline structure (the Niedringhaus application, claim 1 and paragraph [0025]). The IMPACT model does not specifically address the financial conditions of any individual airline. The economic costs associated with TFM operations are computed by the IMPACT model on a "cost per flight" basis (the Campbell paper, Table 1) or as a total cost per TFM operation (the Wojcik presentation, page 14).

f. The ACSEM model examines the effects of a number of market forces on the profit margin of an airline within the airline structure. These market forces are simulated by modifying the fares per airline and per destination, the aircraft size per airline and per aircraft, the fraction of seats reserved for business and leisure passengers, and the cycles taken around an itinerary per airline and aircraft (the Niedringhaus application, claim 1, claim 6 and paragraphs [0028]-[0036]). The IMPACT model merely adjusts the schedule of flights arriving at a single airport in response to TFM operations. The IMPACT model quantifies the economic impact of these modifications on a "cost per flight" basis (the Campbell paper, Table 1) or as a total cost per TFM operation (the

Wojcik presentation, page 14). Further, the IMPACT model cannot simulate the effects of TFM operations on the profit margin of an individual airline.

g. The ACSEM model examines the effects exerted by fleet size (*i.e.*, buying and selling aircraft), itinerary length (*i.e.*, shortening or lengthening itineraries), and airport servicing (*i.e.*, selling airport offices) on a predetermined profit margin for each airline (the Niedringhaus application, claim 1, claim 5, and paragraphs [0037]-[0042]). The IMPACT model merely adjusts the schedule of flights arriving at a single airport in response to TFM operations. The IMPACT model quantifies the economic impact of these modifications on a "cost per flight" basis (the Campbell paper, Table 1) or as a total cost per TFM operation (the Wojcik presentation, page 14). Further, the IMPACT model cannot simulate the effects of TFM operations on the profit margin of an individual airline.

h. The ACSEM model is also responsive to the changes in passenger demand. The ACSEM model provides an opportunity to specify the number of seats on an aircraft occupied by leisure and business travelers (the Niedringhaus application, claim 1 and paragraph [0032]) and to modify the fares charged to each (the Niedringhaus application, claim 1 and paragraph [0056]). The IMPACT model does not address passenger demand or the various classes of passengers on an individual flight (the Campbell paper, page 3 and pages 5-6).

i. The ACSEM model allows the explicit specification of passenger demand and the statistical modeling of that demand (the Niedringhaus application, claims 7-8 and paragraph [0055]). The IMPACT model does not address passenger demand or the



various classes of passengers on an individual flight (the Campbell paper, page 3 and pages 5-6).

j. The ACSEM model simulates the economic behavior of airlines in an airline system through a number of flight states, including boarding, request take-off, take-off, en-route, request landing, landing, and idle for each aircraft and airline in the airline structure (the Niedringhaus application, claim 1, claims 9-15, and paragraphs [0058]-[0067]). The IMPACT model only addresses arrivals at a specific airport (the Campbell paper, page 3, column 1; the Wojcik presentation, page 7) and addresses only the request landing, landing, and idle states of flight (the Campbell paper, page 3).

### ***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully  
requested.

Respectfully submitted,

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